

National Weather Service  
Morristown TN

# The Appalachian Spotter

Volume 4, Issue 1

September 25, 2003

## From the Meteorologist in Charge - Jerry McDuffie

The past 12 months have been quite active in regard to weather. Last October, we had a pretty wet month, followed by tornadoes in November, some snow and severe weather December and January, a very wet February with widespread minor flooding, a slightly dry

March, but then a wet April followed by a very wet May with significant flooding in several places, especially the Chattanooga area. June and July continued the wet trend, although

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Chattanooga Area Flooding May 2003



## Spotter training

What would a spotter newsletter be without a pitch for training. We recommend that spotters receive training at least every 2 years. If you need to schedule training for your group, or need training, contact Howard Waldron, WCM at (423) 586-8706, or [howard.waldron@noaa.gov](mailto:howard.waldron@noaa.gov) or check our training schedule at <http://www.srh.noaa.gov/mrx/classes.htm> for a class near you.

### Special points of interest:

- \* Winter Weather Awareness Week is November 18th-20th
- \* Toll-free Spotter Number for Spotter Reports Only **1-800-697-0075**
- \* General Weather Information Number **423-586-3771**
- \* Spotter e-mail **sr-mrx.spotter@noaa.gov**
- \* **[www.srh.noaa.gov/mrx/](http://www.srh.noaa.gov/mrx/)**

### Special Note: Silver Medal

The article below concerning the Veteran's Day Tornadoes across parts of East Tennessee is a summary of some of the activity that occurred on November 9th and 10th, 2002. Our Forecast Office in Morristown Performed extremely well during these events, and was awarded the Commerce Dept. Silver Medal for the outstanding forecasts and warnings issued prior to and during these events. I am very proud of our staff for this accomplishment. Jerry O. McDuffie, Meteorologist in Charge.

## Veterans Day Tornado - by David Gaffin, Senior Forecaster

On November 10, 2002, the ingredients for a major outbreak of tornadoes came together across the Cumberland Plateau region of east Tennessee. This outbreak showed that our secondary severe weather season during the fall months can produce large severe weather events (although with less frequency compared to the spring months). The number of torna-

does reported on the evening of November 10th made this event the largest across east Tennessee since the super outbreak of April 1974. Numerous supercells (thunderstorms with strong rotation) developed across the region with a total of seven tornadoes reported across the northern Cumberland Plateau, six

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not as much as the 2 previous months. August was extremely wet in northeast Tennessee where the Tri-Cities Airport reported the wettest month every recorded. In addition, it was the wettest summer ever recorded at TRI.

To those of you who called in with reports of snow, rain, flooding, high winds, etc.; we thank you very much. It is very important to receive these calls that tell us more precisely what is happening out there.

What kind of weather will we have this winter. A lot of folks are asking that question. In some years we are able to see a definite trend which may be associated with an El Nino or La Nina system that is occurring or beginning to set up in the Pacific Ocean. This year, at least so far, we see no such features. So, without this definite feature to help guide our forecasts, what do we do? Well, we simply fall back to the old long range forecast and try to determine what patterns may dominate or cause certain types of weather. This is the case for this coming winter. The long range forecast currently calls for "normal" weather. Do we ever have "normal" weather? Rarely. However, there is just not enough data to show any definite trends to forecast this winter; so, the official forecast for December through February, which we term as the winter quarter, is Near Climatology. This means that high temperatures should be mostly in the 45-50 range, while low temperatures are expected to be in the 25-30 range. (See Climatic charts). Precipitation should fall mostly as rain, but a few snows or

freezing rain are likely. Monthly precipitation amounts should range around 3 inches in the north (Bristol) to about 5 inches south (Chattanooga). Monthly snow amounts are "normally" about 4-7 inches north and 1-3 inches in the south for these 3 months. Remember these are normal amounts and the actual amount that falls this winter may significantly exceed these normal amounts. Annual amounts range from about 5 inches south to around 18 inches north (See climate chart for more details).

If we look back over the past winters, we note that snowfall has been on the low side. Last winter, mainly in December and January, we had a couple of "decent" snows ranging from about 2-5 inches with a few locales receiving a little more. We think, with a normal type of winter this year, we would once again receive a few significant snows from December into March.

Again, we thank each of you who took the time and effort to measure the rain, snow, etc and report information to us. This is valuable information for us. Please take some time to be sure you are prepared for a big storm such as snow, ice or wind which might knock the power out for several days. We greatly appreciate your concern, helpfulness, and willingness to be a part of the reporting system. We wish each of you a safe, warm and enjoyable winter.

Jerry O. McDuffie, Meteorologist in Charge

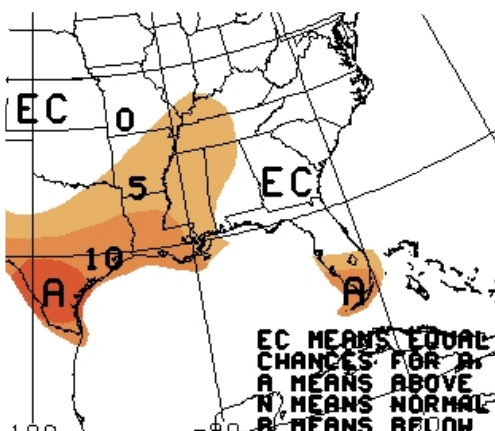


Figure 1. Temperature departure from normal for December, January, and February.

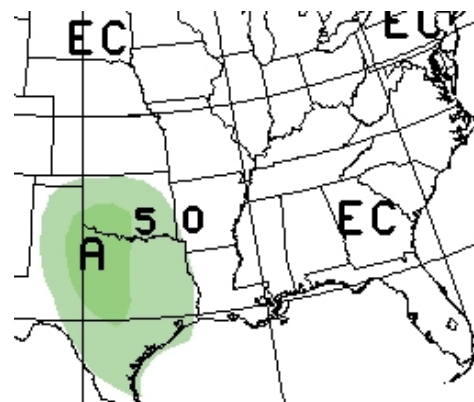


Figure 2. Precipitation departure from normal for December, January, and February.





## Knox County (south Knoxville) Tornadoic Storm of May 15, 2003

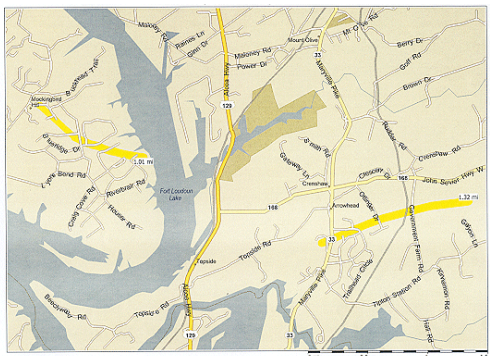
**Stephen Parker, Science and Operations Officer**

On May 15, 2003, two tornadoes touched down in south Knoxville as a large supercell (a thunderstorm with strong rotation) moved southeast across East Tennessee. This storm formed over the northern Cumberland Plateau during the middle of the afternoon, and entered Morristown's County Warning Area in Morgan County around 3 pm EDT. Straight-line wind damage to several trailer homes and golfball size hail was reported near Sun-bright at 3:43 pm. This wind damage was determined to be the result of a phenomenon known as a 'gustnado'.

Gustnado is a slang term for a short-lived, ground-based, shallow, vortex that develops on a gust front associated with either thunderstorms or showers. They may only extend to 30 to 300 feet above the ground with no apparent connection to the convective cloud above. They may be accompanied by rain, but usually are 'wispy', or only visible as a debris cloud or dust whirl at or near the ground. Wind speeds can reach 60 to 80 mph, resulting in significant damage, similar to that of a F0 or F1 tornado. However, gustnados are not considered to be tornadoes. In many cases, it can be difficult to distinguish a gustnado from a tornado. Gustnados are not associated with storm-scale rotation (i.e. mesocyclones), as are true tornadoes; they are more likely to be associated visually with a shelf cloud - typically found on the forward side of a thunderstorm.

The supercell storm continued to move southeast across Anderson County (producing quarter size hail and winds up to 70 mph) before entering Knox County around 4:45 pm. As it entered Knox County, the storm intensified and began to show indications of becoming tornadoic. A Tornado Warning was issued at 4:48 pm for Knox county with radar reflectivity images at 4:50 pm revealing a well-defined 'hook echo' (a classic tornado signature). Hook echoes on the back edge of storms can indicate that rain is being wrapped

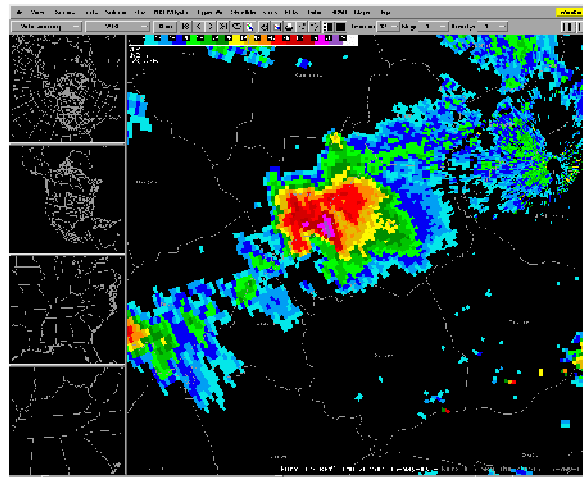
around a strong rotation.



**Figure 1.**  
KMRX base reflectivity image at 4:50 pm on May 15, 2003.

The storm-relative velocity images at this time also indicated developing rotation. Storm-relative velocity images show the velocity of the wind (in relation to the radar) with the motion of the storm subtracted out. The green areas on these images indicate wind moving toward the Morristown radar, while the red areas indicating wind moving away.

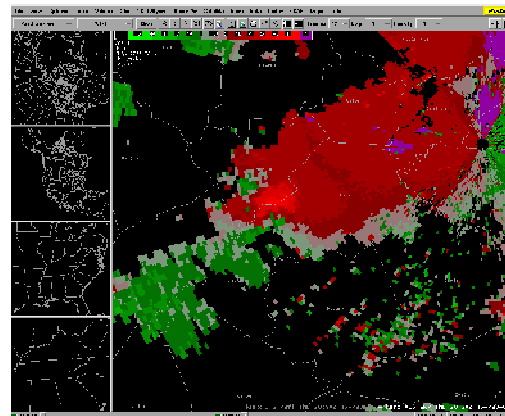
When these two colors are bright and next to each other in a tight couplet, we can infer that there is significant rotation.



**Figure 2.**  
KMRX storm-relative velocity image at 4:50 pm on May 15, 2003.

The first tornado was reported at 5:10 pm near the Lyons Bend area (traveling around a mile on the ground), while the second and final tornado was reported at 5:15 pm south of John Sevier Highway near Apache Trail. This second tornado traveled 1.3 miles and lifted near the intersection of Martinmill Pike and Tipton Station Road. Both tornadoes were rated F1 on the Fujita tornado intensity scale. This supercell storm continued moving southeast into Blount and Sevier Counties, with quarter to golfball hail reported in both counties.

At 6:00 pm, tennis ball size hail was reported with another storm over Loudon county.



**Figure 3.**  
Track map of the two tornadoes on May 15, 2003.

## Storm Climatology (January-August 2003) by Jerry Hevrdeys, General Forecaster

The area experienced six winter storms this year, three in January, two in February, with the greatest snowfall amounts reported across the higher elevations. The winter storm in April was mainly across the mountains, with up to a foot of snow blanketing the highest elevations.

Two tornadoes were reported in south Knoxville on May 15, each tracking for about a mile. No other tornadoes were reported this year, so far.

There were 349 wind damage reports from thunderstorms during the eight month period. Nearly one-third of those occurred in May with 108 reports.

In Addition, there were 118 hail reports through August. The largest hail reported was baseball size. It occurred twice; the first was over Loudon County, the same day as the tornadoes hit Knoxville; and the second occurrence was two days later over Meigs County.

## Winter Safety

### BE PREPARED...Before the Storm

- Have flashlight, extra batteries, NOAA Weather Radio, extra food and water, and emergency heating source and heating fuel available in your home.
- Have a *winter survival kit* in your vehicle including blankets, flashlight, first-aid kit, non-perishable food, extra clothes, sand or cat litter, and a shovel.

### When Caught in a Winter Storm in a Vehicle

- Stay in your vehicle; run the motor ten minutes each hour for heat (open the window and clear exhaust pipes to avoid carbon monoxide poisoning); make yourself visible; exercise.

### When Caught in a Winter Storm in a Building

- Stay inside; eat and drink to provide the body with energy; wear layers of loose-fitting warm clothing.



Caption describing picture or graphic.

**Frostbite** is damage to body tissue caused by that tissue being frozen. Frostbite causes a loss of feeling and a white or pale appearance in extremities, such as finger, toes, ear lobes, or the tip of the nose. **Hypothermia** is the dangerous lowering of body temperature. Warning signs include uncontrollable

shivering, memory loss, disorientation, drowsiness, and apparent exhaustion. For both cold related conditions, get medical help immediately!

# Normals

	<u>December</u>	<u>January</u>	<u>February</u>	<u>Season</u>
<b><u>Bristol</u></b>				
Avg High Temps	47.8	44.1	48.9	46.9
Avg Low Temps	26.8	24.3	27.0	26.0
Avg Temps	37.3	34.2	38.0	36.5
Avg Precip	3.39	3.52	3.40	10.35
Avg Snowfall	2.2	5.5	4.1	11.8
<b><u>Knoxville</u></b>				
Avg High Temps	49.8	46.3	51.7	49.3
Avg Low Temps	31.9	28.9	31.8	30.9
Avg Temps	40.9	37.6	41.8	40.1
Avg Precip	4.49	4.57	4.01	13.07
Avg Snowfall	.07	.37	3.0	7.4
<b><u>Chattanooga</u></b>				
Avg High Temps	52.0	48.8	54.1	51.6
Avg Low Temps	32.7	29.9	32.6	31.7
Avg Temps	42.4	39.4	43.4	41.7
Avg Precip	4.81	5.40	4.85	15.06
Avg Snowfall	.01	2.0	1.3	3.4

## Records

### All Time Cold Temperatures

Chattanooga	-10 Feb 13, 1899; 1/21/1985
Knoxville	-24 Jan 21, 1985
Tri-Cities	-21 Jan 21, 1985

### Snowfall

#### Seasonal

Chattanooga	23.9 1895-95
Knoxville	56.7 1959-60
Tri-Cities	51.0 1959-60

### Coldest Average Winter

Chattanooga	34.8 1962-63
Knoxville	34.2 1963-64
Tri-Cities	30.0 1976-77 1978-79

### Monthly

	Dec	Jan	Feb	Mar
Chattanooga	14.8/1886	10.2/1893	17.3/1895	20.0/1993
Knoxville	25.2/1886	15.1/1962	25.7/1895	20.2/1960
Tri-Cities	12.9/1963	22.1/1966	20.4/1979	27.9/1960

### Coldest Monthly Average

	Dec	Jan	Feb
Chattanooga	34.3 1917	28.5 1977	33.8 1895
Knoxville	29.2 1876	26.7 1940	30.5 1895
Tri-Cities	27.8 1963	22.1 1977	28.1 1958

### 24 Hour

Chattanooga	12.0/1886	10.2/1988	8.7/1960	20.0/1993
Knoxville	8.9/1969	12.0/1962	17.5/1960	14.1/1993
Tri-Cities	9.6/1969	13.0/1996	11.5/1996	

## Hydrology by Brian Boyd

During the second week of May, record flooding occurred on the South Chickamauga Creek in East Ridge, a suburb of Chattanooga. Even the Tennessee River in Chattanooga rose until it was within about six inches of the record level. This major flooding was caused by around 12 inches of rain that fell in 37 hours, mainly in the Hiwassee River basin, particularly in McMinn County. If this much rain had also fallen further upstream along the Tennessee or its larger tributaries, the flooding would have been much worse. In Hamilton County alone, several million dollars' worth of damage was done, but figures are still being tabulated, and claims being paid out. The final figures may not be available for months, according to emergency officials.

Further north, at the Tri-Cities Airport in Sullivan County, record rain fell in August, and during the whole summer. The airport received 11.34 inches of rain during August. Normal rainfall is 3.00 inches. Summer rainfall (June, July, August) was 25.26 inches. Normal rainfall is 11.10 inches. Tri-Cities is well on its way to being the wettest year in recorded history.

From drought to record rainfall in less than one year. It's always smart to be prepared for flooding around here. Normally, when a disaster occurs, it takes around three days for roads, power, and other necessities to get back to normal. Having an already prepared 72 hour emergency kit which you can throw in the car is a must in the southern Appalachians. Here are the essential items you need:

**Water-** one gallon per person per day. Purify with bleach. Replace every three months.

**Food-** nonperishable, canned, dry mixes or freeze dried. Foods **you like** that require no refrigeration, cooking, or preparation. High energy, high protein snack foods as well. **DON'T FORGET THE MANUAL CAN OPENER!**

**Small first aid kit-**easy to store, for small cuts and abrasions, etc.

**Clothing and bedding-**three days is a long time in the same underwear and without a pillow. Should be appropriate to the season.

**Tools-**such as battery operated NOAA Weather Radio or portable radio, flashlight, length of line, extra batteries, etc. Keep in waterproof bags or containers.

**Emergencies supplies and special items-**medication, diapers, baby food, a special toy or blankie for small children, cross-words, etc for older children and adults.

Ask someone who's been in a flood, hurricane, tornado, or even a blackout! They wish they'd had this kit!




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## Fire Weather/Fire Prevention Safety Week - October 6-10th

In conjunction with federal and state land management agencies, the National Weather Service (NWS) at Morristown, Tennessee is participating in the fire weather/fire prevention awareness week from October 6<sup>th</sup> through the 10<sup>th</sup>.

During the week, different topics concerning fire weather and prevention will be discussed which will help educate and increase the aware-

ness of fire weather and fire safety. The following topics will be addressed: General Fire Weather, Closer look at how weather conditions effects fire behavior, Drought and its effects on wildfires, Red Flag Warnings - Extreme Fire Behavior, and a Look at our Primary and Secondary Fire Weather Seasons.

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The daily topics will also include fire safety and prevention tips. Some of the tips included are the following: campfire and debris burning safety and children role in preventing fires. For additional fire weather information, please go the following website: [www.srh.noaa.gov/mrx/firewx.htm](http://www.srh.noaa.gov/mrx/firewx.htm). For detailed information on protecting your home from wildfires, please visit the firewise website at [www.firewise.org](http://www.firewise.org).

"The driest months of the year...leads us into this potentially dangerous fire season."



As we approach the fall season with the brilliant display of autumn colors and falling leaves, we also have the increased potential of wildfires. Even though we have seen one of the wettest summers on record across much of east Tennessee, southwest Virginia, and southwest North

Carolina, periods of dry weather are common during the months of October and November which could increase the potential of wildfires. The fallen leaves can dry out quickly and act

as a source of fuel for fire development, especially if the weather pattern becomes dry with low humidity, breezy conditions and unseasonably warm temperatures.

Since weather is one of the most significant factors in determining the severity and potential of wildfires, a core mission of the NWS at Morristown, Tennessee is to provide weather support to

area land management agencies. We provide daily detailed forecasts of wind speed, humidity, temperatures, transport winds, mixing heights, etc., to aid in containing the spread of forest fires.

An accurate weather forecast can mean life or death to a fire fighter, and is also critical in protecting forest and range lands as well as the increasing number of homes in the wild-land / urban interface. The NWS at Morristown works closely with the following land management agencies to provide wildfire support: Cherokee National Forest, Great Smoky Mountain National Park, Jefferson National Forest, Nantahala National Forest and Tennessee, Virginia, and North Carolina Divisions of Forestry.

## Newer, Faster, Better By Shawn O'Neill, Senior Forecaster

The Morristown forecast office has recently upgraded its Advanced Weather Interactive Processing System (AWIPS) workstations. New to the setup are three 19 inch LCD monitors. The forecaster now has an additional monitor for expanded data viewing. The flat screen technology creates increased desk space which helps when performing hand analysis of charts and maps.

The data sets that contain model packages, hemispheric satellite images and radar mosaics are extremely large. The resolution and quantity of these data sets is always expanding. Increases in processing speed enables the forecasters to study more data to enhance their forecasting decisions.

A three button mouse glides seamlessly through the three monitors. This offers the forecaster the ability to multitask at one workstation. The user now has the capability to partake in inter-office chat rooms, scan over several different data sets, issue a Severe Thunderstorm Warning and construct a graphical forecast simultaneously.

The operating system has been changed from UNIX to LINUX. The CPU is a 2.4 Ghz dual Intel P4 class built in an IBM IntelliStation Z Pro series. The 10,000 RPM hard drive is 36GB. Advancements in forecasting tools will lead to improvements in forecast products.





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tracted out. The green areas on these images indicate wind moving toward the Morristown radar with the red areas indicating wind moving away from the radar. When these two areas are next to each other in a tight couplet, we can infer that there is rotation.

This supercell thunderstorm continued moving rapidly to the east producing another tornado near Briceville in Anderson County around 9:00 pm EST and also near Medford (a few miles further east). This tornado was rated an F2 (winds estimated between 113 and 157 mph) and was around 5.5 miles in length and 200 yards in width. Numerous homes with substantial damage were reported with this tornado.

Another supercell thunderstorm developed further southwest across the Cumberland Plateau later in the evening. An F1 tornado (with winds estimated around 85 to 90 mph) touched down just west of the intersection of Highways 101 and 285 in northwest Bledsoe County between 8:25 and 8:30 pm CST (9:25 and 9:30 pm EST). This tornado passed just north of the Bellview community and was found to have traveled around 6.2 miles with a path width of 100 yards.

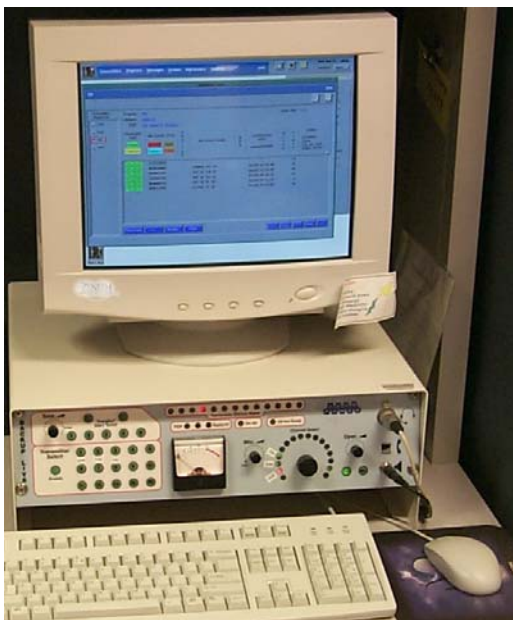
Yet another supercell thunderstorm later in the evening tracked further north across the Cumberland Plateau producing an F3 tornado (with winds estimated between 158 and 206 mph) in Cumberland County. This tornado caused four fatalities (two couples in mobile homes) and eleven injuries in the Lantana and Homestead communities south of Crossville. This tornado touched down around 9:45 pm CST 4.1 miles southwest of Crossville (near Lantana) and traveled 8.2 miles across Cumberland Mountain State Park with a path width of a half mile. The tornado lifted around 9:55 pm CST 5.6 miles southeast of Crossville (near Homestead). Numerous well-built homes were significantly damaged with several trees and power lines down.

## Five Years of Radio Automation

That's right! Believe it or not the automation of our NOAA Weather Radio products has been going on for 5 years. When we started in the Fall of 1998 we of course didn't automate very many products and the voice quality left a lot to be desired. However, over the past 5 years we have been able to automate almost any type of product imaginable and do so in clear and understandable voices. Last year we told you about the new

voices named Craig and Donna. Just a few short months ago we replaced Craig with an ever better voice named Tom. In addition, many upgrades have been made to the Donna voice. These two voices should be with us for awhile. This will give us the time to make minor tweaks to the voice inflections and pronunciations as necessary. That's where you come in. We

monitor the radio 24 hours a day for quality and content. However, sometimes the way one of the voices says a word or phrase might be slightly off the local pronunciation in your area. This usually occurs with the name of a small town, creek, etc... We appreciate your input to the Radio Program and would like you to send us an email or give us a call when you hear something that doesn't sound quite right. Thank you for all of your input in the past. I look forward to hearing from you in the future.

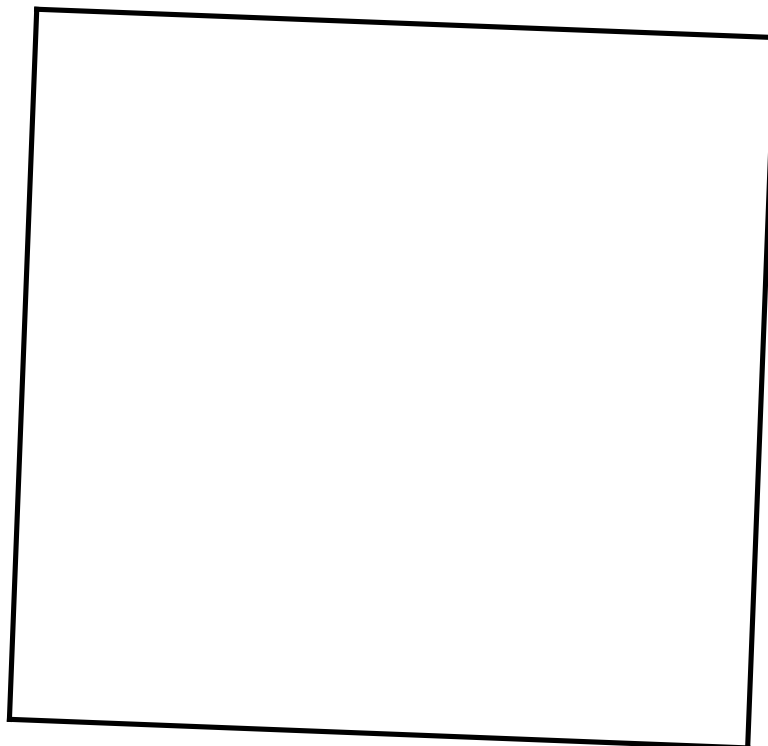


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[www.srh.noaa.gov/mrx/](http://www.srh.noaa.gov/mrx/)



### Web Sites of Interest

#### Morristown Weather

Southern Region  
National Weather  
Storm Prediction Center  
National Hurricane Center  
Aviation Weather  
Weather Charts on the Net  
Cloud Chart

[www.srh.noaa.gov/mrx](http://www.srh.noaa.gov/mrx)

[www.srh.noaa.gov](http://www.srh.noaa.gov)  
[weather.gov](http://weather.gov)  
[www.spc.noaa.gov](http://www.spc.noaa.gov)  
[www.nhc.noaa.gov](http://www.nhc.noaa.gov)  
[aviationweather.gov/](http://aviationweather.gov/)  
[weather.noaa.gov/fax/graph.shtml](http://weather.noaa.gov/fax/graph.shtml)  
[asd-www.larc.nasa.gov/SCOOOL/cldchart.html](http://asd-www.larc.nasa.gov/SCOOOL/cldchart.html)

**For a color version of this  
mailout, and much more in-  
formation, check out our  
web page**

## Winter Reporting

Snow can be one of the simplest, and yet is generally one of the most misunderstood weather elements to observe. To correctly measure and report snow depth, you need to measure several locations in open exposed areas and average these measurements to get the accurate snow depth. If you want to get the greatest depth be sure that this is reported as a drift, not the snow depth. If you took a number of measurements and found the average to be 10 inches with the greatest 19 inches, report snow depth of 10 inches with drifts to 19 inches. Like we said, simple but easy to misunderstand

<b>SNOW</b>	1 INCH OR MORE PER 12 HOURS
<b>SLEET OR FREEZING RAIN</b>	WHEN TRAVEL BECOMES HAZARDOUS, REPORT ICE ACCUMULATION IF POSSIBLE
<b>NON-CONVECTIVE HIGH WINDS</b>	MEASURED OR ESTIMATED WINDS OVER 50 MPH, ANY DAMAGE CAUSED BY WIND
<b>RAIN</b>	1 INCH OF RAIN DURING AN EVENT
<b>FLOODING</b>	WHEN FLOODING THREATENS ROADS OR PROPERTY